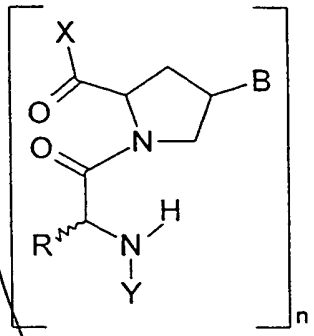
CLAIMS

1. A compound of formula (I):



(I)

where n is 1 or 2-200,

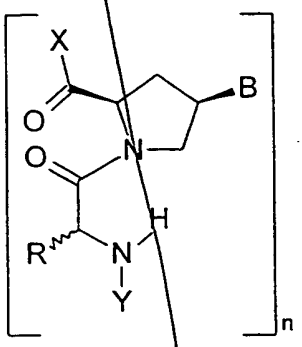
B is a protected or unprotected base capable of Watson-Crick or of Hoogsteen pairing,

R is H, C_1 - C_{12} alkyl, C_6 - C_{12} aralkyl or C_6 - C_{12} heteroaryl which may carry one or more substituents preferably selected from hydroxyl, carboxyl, amine, amide, thiol, thioether or phenol.

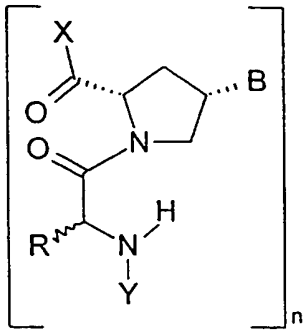
X is OH or OR' where R' is a protecting group or an activating group or a lipophilic group or an amino acid or amino amide or nucleoside,

Y is H or a protecting group or a lipophilic group or an amino acyl group or nucleoside.

2. A compound as claimed in claim 1, wherein the structure is (II) or (III) where n, B, R, X and Y are as defined in claim 1.



(II)



(III)

3. A compound as claimed in claim 1 or claim 2, wherein B is a naturally occurring nucleobase selected from adenine, cytosine, guanine, thymine and uracil.

4. A compound as claimed in any one of claims 1 to 3, wherein -CO-CHR-NH- is a residue of a naturally occurring amino acid.

5. A compound as claimed in any one of claims 1 to 4, wherein R is CH_2OH or $(CH_2)_4NH_2$ or H.

6. A compound as claimed in claim 1, wherein

n is 1,

B is a naturally occurring nucleobase selected from adenine, cytosine, guanine, thymine and uracil.,

R is H or CH_2OH or $(CH_2)_4NH_2$.

X is OH or OR',

R' is an activating group for example pentafluorophenyl,

Y is H or a protecting group for example Fmoc.

7. A compound as claimed in any one of claims 1 to 5, wherein n is 2-200 preferably 5-30.

8. A hybrid comprising two strands of which a first strand is a compound according to claim 7 and a second strand is an oligo- or poly-nucleotide or nucleic acid.

9. A hybrid as claimed in claim 8, wherein the two strands are hybridised to one another in a 1:1 molar ratio by base-specific Watson-Crick base pairing.

10. A method of making the peptide nucleotide analogue of formula (I), comprising the steps of:

a) reacting an N-protected C-protected 4-hydroxy proline with a base selected from N_3-protected thymine, N_6-protected adenine, N_4-protected cytosine, N_2-O_6-protected guanine and N_3-protected uracil.

b) deprotecting the proline amino group of the product of a),

c) reacting the product of b) with an N-protected amino acid,

d) optionally removing protecting groups from the product of c).

11. A method as claimed in claim 10, wherein in a) 4-hydroxyproline in the form of a N-Boc/Dpm ester is reacted with N_3-benzoyl thymine, N_6-benzoyl adenine, N_4-benzoyl cytosine, N_2-benzoyl-O_6-(4'-nitrophenylethyl)guanine or N_3-benzoyl uracil, and in c) an Fmoc amino acid ester is used.

12. A method as claimed in claim 10 or claim 11, wherein an N-protected C-protected trans-4-hydroxy proline is used in a).

13. A method of converting a peptide nucleotide analogue of formula (I) in which n is 1 into a peptide oligonucleotide of formula (I) in which n is 2-200, comprising the steps of:

i) providing a support carrying primary amine groups,

ii) coupling an N-protected peptide nucleotide analogue of formula (I) to the support,

iii) removing the N-protecting group,

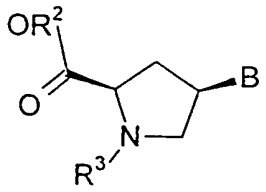
iv) coupling an N-protected nucleotide analogue of formula (I) to the thus-derivatised support,

v) repeating steps iii) and iv) one or more times, and

vi) optionally removing the resulting peptide oligonucleotide from the support.

14. A method as claimed in claim 13, wherein a pentafluorophenyl ester of the peptide nucleotide analogue is used in step ii) and iii).

15. A compound of formula (IV)



(IV)

where R^2 is H or a protecting group,

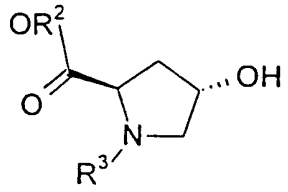
R^3 is H or a protecting group compatible with R^2, and

B is a protected or unprotected heterocyclic base.

16. A compound as claimed in claim 15, wherein R^2 is diphenylmethyl and R^3 is t-butoxycarbonyl.

17. A compound as claimed in claim 15 or claim 16, wherein B is a protected or unprotected nucleobase selected from adenine, cytosine, guanine, thymine and uracil.

18. A compound of formula (V)



(V)

where R^2 is diphenylmethyl, and

R^3 is t-butoxycarbonyl.

19. A compound as claimed in any one of claims 1 to 7, wherein at least one of B, R, X and Y includes a signal moiety.